



(11) (C) 1,338,210

(21) 614,950

(22) 1989/09/29

(45) 1996/04/02

(52) 222-8.1

BREVETS

MARQUES
DE COMMERCE

DROITS
D'AUTEUR

DESSINS
INDUSTRIELS

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INTÉGRÉS

(51) Int.Cl. ⁶ B67D 3/00; B65B 3/06

(19) (CA) CANADIAN PATENT (12)

PATENTS

TRADE-MARKS

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DESIGN

INTEGRATED
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(54) Liquid Container Support and Hygienic Liquid Dispensing System

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(30) (US) U.S.A. 257,627 1988/10/14

(57) 28 Claims



1338210

The present invention relates generally to liquid dispensers, and more particularly concerns an inverted water bottle container support, hygienic delivery system and a hygienic cap for use in such systems.

5 A cooler and dispenser for bottled water normally has a cooling reservoir within which the inverted neck of a water bottle is disposed. Water flows from the bottle until the water level closes the bottle neck and typically a refrigeration system cools the reservoir and the water being
10 held there. Additionally, some systems are provided with an additional tank, supplied with water from the reservoir, and have a heating system which provides hot water. Water is dispensed by draining the reservoir, usually through a faucet. When the water level falls below the inverted bottle
15 neck, air in the reservoir can enter the bottle, bubble to the top, and release more water to maintain the water level in the reservoir.

Some systems are provided with a cap over the neck of the water bottle so that upon inverting, water is contained
20 until the water bottle is properly inserted into the water cooler. In order to provide fluid communication, these types of water coolers are often provided with a feed tube which pierces the cap upon insertion of the inverted bottle in the cooler and provides a conduit to dispense water into the
25 reservoir. Water coolers of this general type can be found in U.S. Patent No. 4,699,188 to Baker et al.

It sometimes becomes necessary to replace a partially empty water bottle with a new water bottle containing either the same liquid or a different liquid, or otherwise remove a
30 partially filled water bottle. In conventional systems, however, upon removal, water is discharged through the neck of the water bottle without control. One solution to a similar problem is presented as a resealable plugtype fitting for use with flexible bag containers and is



1338210

described in U.S. Patent No. Re. 32,354 to Chester Savage,
assignor to Scholle Corporation. An improved hygienic liquid
dispensing system for use in water bottle coolers which
allows for the removal of a partially filled water bottle is
5 necessary.

In accordance with the present invention there is provided a
liquid container support and hygienic delivery system for
dispensing liquid from an inverted container having a
depending neck defining an opening into a dischargeable
10 reservoir open at its upper end and housed within a cabinet.

The present invention thus provides a hygienic liquid
dispensing system which allows for the removal of a
partially filled liquid container.

The invention also provides system whereby removal of the
15 liquid container causes the liquid to be sealed within the
container.

The present invention also provides a means for retrofitting
existing water cooler systems with a hygienic system.

A mounting is adapted to fit on the upper portion of the
20 cabinet and defines an annular ring for supporting the
inverted container thereon. The mounting means also defines
a tapered entry portion extending downwardly and inwardly
from said annular ring for receiving the inverted container
neck therein. There is also provided a means for sealingly
25 closing the open upper end of the reservoir and for
supporting an upstanding feed tube dimensioned to penetrate
into the container neck to provide a hygienic flow path for
delivering liquid from the inverted container into the
reservoir.

30 More specifically, a hygienic cap is provided for use with
the system having a lid portion adapted to overlies and
sealingly close the opening in the bottle neck. Also

provided is an annular skirt extending axially away from the lid portion to surround a portion of the bottle neck and an axially inwardly extending recess formed therein including a first annular sleeve portion located generally centrally in the lid portion and integrally connected thereto and a second annular plug portion connected to the inner end of the sleeve portion and extending axially inwardly therefrom. A closed inner end of the plug portion for normally closing the recess is provided and a frangible connection between the plug portion and the sleeve portion is adapted to be broken so that the plug portion axially separates from the sleeve portion when forcibly inserting a feed tube into the recess to permit the discharge of liquid from the container. Additionally, there is provided a means for retaining the plug portion on the feed tube so that, upon removal of the feed tube, the plug portion is drawn into the sleeve portion of the cap recess and reseals the liquid in the container.

These and other features and advantages of the invention will be more readily apparent upon reading the following description of a preferred exemplified embodiment of the invention and upon reference to the accompanying drawings wherein:

FIGURE 1 is a fragmentary side elevation view of the water bottle cooler and hygienic liquid dispensing system including the hygienic cap of the present invention, with certain portions broken away in section;

FIG. 2 is a section taken substantially along line 2-2 in FIG. 1 showing the partial insertion of the water bottle in the hygienic liquid dispensing system according to the present invention;

FIGS. 3a and 3b are fragmentary sections taken substantially along line 3-3 in FIG. 2 showing a detachable connection between an adaptor unit of the hygienic liquid dispensing system and an existing water bottle cooler;

1338210

FIGS. 4a, 4b and 4c are enlarged, fragmentary side elevation views, partly in section, showing insertion and removal of the feed tube with respect to the hygienic cap in the hygienic liquid dispensing system according to the present invention; and

FIG. 5 is a fragmentary perspective view showing an alternative adaptor unit having a tapered side wall sitting on top of a water cooler housing.

While the invention will be described and disclosed in connection with certain preferred embodiments and procedures, it is not intended to limit the invention to those specific embodiments. Rather it is intended to cover all such alternative embodiments and modifications as fall within the spirit and scope of the invention.

Turning now to the drawings, there is shown in greater detail, a bottled water cooler 10 including a cabinet 20 of the type having an open-topped cooling reservoir 12 which is disposed to receive the inverted neck of a bottle 15 containing water or the like. Typically, the reservoir 12 and its contents are subjected to temperature control by a refrigeration system and/or a heating system (not shown), in the lower portion of the cabinet 20, and water is taken from the reservoir through a drain pipe 22 and a faucet 13 mounted on a cabinet front panel 14. In the illustrated cooler 10, the front panel 14 is recessed within the cabinet periphery so as to set the faucet 13 back into the cabinet and thus prevent inadvertent contact.

In keeping with the invention, a mounting adapter 25 is disposed on the upper portion of the water cooler cabinet 20. To properly support the inverted water bottle, the mounting adapter 25 is provided with an annular ring 24 on its upper portion 26 and in order to properly receive and guide the inverted water bottle 15, the mounting adapter 25 is provided with a tapered entry portion 27 extending

downwardly and inwardly from the annular ring 24 on the upper portion 26 of the mounting adapter 25. The entry portion 27 is formed with a lower end 29 having a length greater than the container neck 51, so that substantially all of the weight of the inverted water bottle is supported by the annular ring 24 of the mounting adapter 25 rather than by the water bottle neck. In the illustration of FIG. 1, the mounting adapter 25 is provided with downwardly extending side walls 17 and also includes internal stiffening ribs 28 interconnecting the side walls 17, the raised upper portion 26 and the tapered entry portion 27 so as to support the annular ring 24.

As more particularly depicted in FIG. 2, in the preferred embodiment, an annular diaphragm element 41 coupled to the lower end 29 of the entry portion 27 of the mounting adapter 25 sealingly closes the upper portion of the reservoir 12 and supports an upstanding feed tube 45 whose operation is described in greater detail below.

In order that the hygienic liquid dispensing system may be retrofitted to existing water coolers, the diaphragm/feed tube configuration described above carries a flexible peripheral member 43 for sealingly engaging and closing the open end of the reservoir 12. To facilitate the retrofitting between the mounting adapter and an existing water cooler having the diaphragm/feed tube connection, a quick disconnect means is provided having bayonet-type tab fittings 33 on the diaphragm and complementary lugs 34 on the lower end 29 of the entry portion 27 of the mounting adapter 25. As shown in greater detail in FIGS. 3a and 3b, one or more of the bayonet-type tab fittings 33 may be provided with centering detentlike dimples 35 for engagement with complementary recesses 36 formed in the upper surface of the lugs 34 to insure proper engagement of the quick disconnect means. It will be understood, of course, that other suitable attachment means may be provided, if desired.

Pursuant to another feature of the preferred embodiment, and as depicted in FIGS. 1 and 2, an air filter 30 is provided with a filter element 37, having a filter medium removably fitted on the housing 38 of the filter 30. A conduit 39 is
5 connected to the filter housing 38 and passes via a grommet 47, through the diaphragm element 41, so that air cannot enter the reservoir except by passing through the filter medium. A more detailed description of the filter 30 can be found in U.S. Patent No. 4,834,267, issued May 30, 1989 to
10 Schroer et al. It will also be appreciated with reference to FIG. 1, that the filter 30 may be conveniently located under the raised upper portion 26 of the mounting adapter.

In keeping with the invention, a hygienic cap 50 for a liquid dispensing system is shown in FIGS. 4a, 4b and 4c. As
15 is conventional with water bottles, a neck portion 51 defines a discharge opening through which liquid may dispense. In order to seal liquid within the bottle, hygienic cap 50 is provided with a lid portion 53 adapted to overlies and sealingly close the discharge opening defined by
20 the neck 51.

Additionally, an annular skirt portion 55 of the cap 50 extends axially away from the periphery of the lid portion 53 and is adapted to surround a portion of the neck 51 so as to sealingly retain contact with the neck portion 51 of the
25 water bottle. As will become more apparent below, the hygienic cap 50 is provided with an axially inwardly extending recess 60 formed integrally with or otherwise connected to the lid portion 53. The axially inwardly extending recess 60 includes a first annular sleeve portion
30 62, which is located generally centrally in the lid portion 53 and is preferably integrally connected thereto.

In keeping with the present invention, a second annular plug portion 70 is connected to the inner end of the first annular sleeve portion 62 and extends axially inwardly

therefrom. As shown in the illustrated embodiment, the second annular plug portion 70 is provided with a closed inner end 71 to fully seal liquid within the inverted water bottle.

5 In keeping with another important aspect of the invention, the second annular plug portion 70 is preferably integral with the first annular sleeve portion 62 and is connected thereto through a frangible connection 75 in order to allow the plug portion 70 to be axially separated from the sleeve
10 portion 62 upon the forceable insertion of a feed tube 45 into the inwardly extending recess 60 to facilitate the discharge of liquid from the inverted water bottle. The frangible connection 75 includes an area of the recess which has reduced wall thickness at the inner end of the sleeve 62
15 where the plug portion 70 is connected thereto. This single piece construction not only reduces assembly time but also avoids separation and loss of the plug portion. To this end, in the preferred embodiment, the cap 50 is formed in a single piece. However, it will be appreciated that a two-
20 piece construction may sometimes be advantageous. In this regard, the multiple pieces may thereafter be assembled in a one-piece configuration either by spin welding, sonic welding, chemical bonding or the like.

In order to temporarily secure the plug 70 on the feed tube
25 45 when the feed tube is inserted in the recess 60, the plug portion 70 is formed with an internal gripping rib 72. In a complementary way, so that the feed tube 45 may retain the plug portion 70 upon insertion of the feed tube into the inwardly extending recess 60, feed tube 45 is provided with
30 an annular groove 42 formed in its outside surface. In order to facilitate proper insertion of the feed tube 45 in recess 60, and proper mating engagement between the gripping rib 72 of the plug portion 70 and the annular groove 42 of feed tube 45, feed tube 45 may be provided with an upper portion
35 44 of reduced diameter and a tapered annular ramp portion 63

adjacent the annular groove 42 for guiding the annular gripping rib 72 into the annular groove 42.

- Upon further insertion of the feed tube into the recess 60, the frangible connection 75 is broken, thereby allowing the extension of the feed tube 45 into the neck of the inverted water bottle. In a conventional manner, feed tube 45 is formed with an internal bore 46 and at least one radial inlet 48 communicating therewith to allow the dispensing of liquid from the interior of the inverted water bottle to the reservoir 12 as more fully described in the above mentioned U.S. Patent No. 4,699,188 to Baker et al. As is apparent and in order to allow fluid flow, the inlet 48 is spaced from the end of the feed tube 45 by a distance that is greater than the internal depth of the plug 70.
- As shown in FIG. 4b, the exterior surface of the feed tube 45 is dimensioned with respect to the interior of the first annular sleeve portion 62 so that a sealing engagement is effected upon insertion of the feed tube 45 into the recess 60 and the inverted water bottle.
- In keeping with another important aspect of the invention, the hygienic liquid dispensing system is provided with means for resealing the inverted water bottle upon removal of the water bottle from the cooler or, conversely, upon removal of the feed tube from the hygienic cap 50. Upon removal of feed tube 45 from the inverted water bottle 15, annular groove 42 retains the annular plug portion 70 of hygienic cap 50 until the plug portion is fully drawn into the axially inwardly extending recess 60 of lid portion 53. In the preferred embodiment, the plug portion 70 is formed with an outside annular surface dimensioned to sealingly fit within the sleeve portion 62 when the feed tube 45 is withdrawn from the recess 60. For this purpose, the plug 70 is preferably formed with a tapered lead-in section 69 adjacent the frangible connection 75 for guiding the plug 70 into the

sleeve 62 when the feed tube 45 is withdrawn from the recess 60. Adjacent its closed end 71, the plug portion 70 is also preferably provided with an annular flange 73 in order to prevent the plug portion 70 from being removed from the
5 hygienic cap 60. In the preferred embodiment, the external annular flange 73 is dimensioned to seat on the inner end of the sleeve 62 when the plug 70 is drawn into the sleeve. Additionally, in order to sealingly engage the plug portion 70 with the first annular sleeve portion 62 of the hygienic
10 cap, plug portion 70 is provided with an external annular recess 77 which sealingly cooperates with a radially inwardly projecting bead 76 of sleeve portion 62. Moreover, this external annular groove/internally projecting bead combination provides a gripping means that will allow the
15 feed tube 45 to mate with and retain the plug portion 70 prior to the plug portion becoming slideably disengaged with respect to the sleeve portion 62.

In the preferred embodiment, a hygienic cap 50 is also provided with a line of weakness 80 on the skirt 55
20 extending toward the lid portion 53 and a pull tab 85 extending axially from the skirt. Pull tab 85 is provided to facilitate manually tearing the skirt 55 along the line of weakness 80 when the cap 50 is removed from the container. Additionally, the cap is formed to receive a protective seal
25 84 covering the recess 60 to prevent contaminants from entering therein. The protective seal 84 also serves to indicate whether the cap has been tampered with prior to insertion of the feed tube 45 into the recess 60.

An alternate embodiment of the invention is illustrated in
30 FIG. 5 wherein the mounting adapter 25a is designed to be positioned on top of an existing water cooler 10a having a flat upper surface. The above described hygienic water bottle system having the hygienic cap, feed tube and mounting diaphragm is housed within the cooler 10a, but is
35 not shown here.

1338210

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A liquid container support and hygienic delivery system for dispensing drinking water or other potable liquid to a predetermined maximum liquid level in a dischargeable reservoir open at its upper end and housed within a cabinet from an inverted unpressurized container having an internal liquid confining surface defined by a substantially rigid, generally cylindrical body with a radially inwardly directed downwardly sloping shoulder portion merging into a generally cylindrical depending neck defining an opening closed by a coaxial cap circumferentially surrounding at least an outer axial portion of said neck and having an internal recess therein including a hollow tubular sleeve portion and a plug and recess sealing portion connected thereto and defining a closed end with a central cavity having internal gripping means therein comprising, in combination,

removable mounting means adapted to fit on the upper portion of said cabinet and defining an annular ring for supporting said sloping shoulder portion of said inverted container thereon, said removable mounting means also defining a tapered entry portion having a substantially closed inner wall extending downwardly and inwardly from said annular ring for receiving said depending container neck and said coaxial cap therein, said entry portion having a substantially closed bottom end and a length greater than that of said depending container neck and said coaxial cap when said inverted container shoulder portion is supported on said annular ring,

an upstanding feed tube dimensioned to penetrate into said hollow tubular sleeve portion of said coaxial cap and said container neck to provide a hygienic flow path for delivering liquid from said inverted unpressurized container into said reservoir to said predetermined maximum liquid level and for admitting air from said reservoir above said liquid level into said container to displace the liquid

delivered therefrom, said feed tube having upper and lower end portions,

means carried by said removable mounting means for rigidly supporting said upstanding feed tube with said upper end projecting upwardly from said bottom end of said entry portion and means depending downwardly from said bottom end of said entry portion of said removable mounting means into said reservoir to define said predetermined maximum liquid level,

said upper end of said feed tube having a length greater than said recess in said coaxial cap and a tip portion disposed and dimensioned for entry into said recess to axially separate said cap plug and recess sealing portion from said hollow tubular sleeve portion when said container is inverted and lowered onto said mounting means with said sloping shoulder portion of said inverted container supported by said annular ring in order to permit the discharge of liquid from said container into said reservoir to said predetermined maximum liquid level and admission of air from said reservoir above said liquid and into said container, said tip portion of said upstanding feed tube being formed with complementary external gripping means disposed and dimensioned for securing said plug and recess sealing portion on said feed tube and for holding said plug and recess sealing portion free of contact with said internal liquid confining surface of said inverted container when said feed tube is inserted in said recess of said coaxial cap to axially separate said plug and recess sealing portion from said hollow tubular sleeve portion when said sloping shoulder portion of said inverted container is supported on said annular ring of said mounting means,

and said upstanding feed tube being dimensioned and disposed to draw said plug and recess sealing portion into interfitting sealing relation with said hollow tubular sleeve portion when said inverted container is lifted off

1338210

said support ring and said feed tube is withdrawn from said recess of said coaxial cap.

2. A liquid container support and hygienic delivery system for dispensing drinking water or other potable liquid into a dischargeable reservoir open at its upper end and housed within a cabinet from an inverted container having a substantially rigid body with a radially directed shoulder portion merging into a generally cylindrical depending neck defining an opening comprising, in combination,

removable mounting means adapted to fit on the upper portion of said cabinet and defining an annular ring for supporting said shoulder portion of said inverted container thereon, said removable mounting means also defining a tapered entry portion having a substantially closed inner wall extending downwardly and inwardly from said annular ring for receiving said inverted container neck therein, said entry portion having a lower end and a length greater than that of said container neck when said inverted container shoulder portion is supported on said annular ring, means coupled to said entry portion for sealingly closing said open upper end of said reservoir and for supporting an upstanding tube dimensioned to penetrate into said container neck to provide a hygienic flow path for delivering liquid from said inverted container into said reservoir,

said liquid container being provided with a coaxial cap circumferentially surrounding at least an outer axial portion of said neck and having an internal recess therein including a sleeve portion and a plug and recess sealing portion connected thereto, said upstanding feed tube being disposed for entry into said recess to axially separate said plug and recess sealing portion from said sleeve portion when said container is inverted and lowered onto said support ring in order to permit the discharge of liquid from said container, said plug and recess sealing portion being formed with internal gripping means therein and said feed

tube being formed with complementary external gripping means for securing said plug and recess sealing portion on said feed tube when said feed tube is inserted in said recess and said plug and recess sealing portion is axially separated from said sleeve portion, said plug and recess sealing portion also being dimensioned to sealingly interfit with said sleeve portion when said inverted container is lifted off said support ring and said feed tube is withdrawn from said recess.

3. A system as defined in claim 1 or 2 wherein said upstanding feed tube is hollow and includes an internal bore and a radial inlet communicating therewith, said inlet being spaced from the tip end of said feed tube by a distance greater than the depth of said central cavity in said plug portion of said recess.

4. A system as defined in claim 3, wherein said internal gripping means includes a radially inwardly projecting annular lip portion formed in said plug cavity and said external gripping means includes an annular groove formed in said tip portion of said upper end of said feed tube.

5. A system as defined in claim 4, wherein said feed tube tip portion is formed with a tapered annular ramp portion adjacent said annular groove for guiding said inwardly projecting annular lip portion in said plug cavity into said annular groove.

6. A system as defined in claim 1, including a substantially annular diaphragm element coupled to said entry portion of said mounting means for sealingly closing said upper end of said reservoir.

7. A system as defined in claim 2, wherein said means for sealingly closing said upper end of said reservoir includes a substantially annular diaphragm element coupled to said entry portion of said mounting means.

8. A system as defined in claim 6 or 7, wherein said diaphragm element carries a flexible peripheral member for sealingly engaging and closing said open upper end of said reservoir.
9. A system as defined in claim 8, wherein said diaphragm element is formed with quick-disconnect means for coupling said diaphragm element to said entry portion of said mounting means.
10. A system as defined in claim 6 or 7, wherein said coupling means is detachably connected to said entry portion to permit ready removal therefrom.
11. A system as defined in claim 10, wherein said coupling means is provided with an aperture therein outboard of said entry portion for admitting air into said reservoir as liquid is discharged therefrom.
12. A system as defined in claim 11, including air filter means connected to said aperture for filtering the air admitted into said reservoir.
13. A system as defined in claim 12, wherein said removable mounting means includes a downwardly extending outer side wall adapted to engage said cabinet and internal ribs interconnecting said outer side wall and said downwardly and inwardly extending closed inner wall of said tapered entry portion.
14. A liquid container support and hygienic delivery system for dispensing drinking water or other potable liquid from a substantially rigid-bodied inverted container into the open upper end of a dischargeable reservoir housed within a cabinet through an opening defined in a generally cylindrical depending neck of the container, comprising mounting means for embracingly supporting the depending neck of the inverted container over the open upper end of the

1338210

reservoir, and an upstanding feed tube supported so as to extend through sealing means sealingly closing the said open upper end of the reservoir and dimensioned to penetrate into the neck of the inverted container through a sealing arrangement thereof to provide a hygienic flow path for delivering liquid from the inverted container into the reservoir, wherein the inverted container has an inwardly and radially directed shoulder portion merging into the neck and a coaxial cap surrounding at least an outer axial portion of the neck of the container and having an internal recess therein including the sealing arrangement in the form of a sleeve portion, a sealing plug portion is connected to said sleeve portion, and the mounting means comprises mounting means adapted to fit on the upper portion of the cabinet and defining an annular ring for supporting the shoulder portion of the inverted container thereon, the mounting means also defining a tapered entry portion extending downwardly and inwardly from the annular ring for receiving the inverted neck of the container and the coaxial cap, the tapered entry portion having a lower end and a length greater than that of the neck of the container and the coaxial cap when the shoulder portion of the inverted container is supported on the annular ring, the sealing means for sealingly closing the open upper end of the reservoir and the upstanding feed tube being coupled to the mounting means so that the feed tube is disposed for entry into the recess of the coaxial cap to separate the plug portion from the sleeve portion when the container is inverted and lowered onto the annular ring and thereby to provide the said hygienic flow path; the feed tube having a tip end, and substantially hollow tubular body portion and a base portion, the feed tube body portion being dimensioned for close fitting sealing relation with the inside-diameter of the internal recess to prevent leakage therebetween when the feed tube is inserted into the recess, the feed tube having an internal bore and at least one radial opening

communicating therewith, the radial opening being spaced from the tip end of the feed tube by a distance that is greater than the internal depth of the plug portion, the radial opening and the bore defining a fluid passage for dispensing the liquid from the container into the reservoir up to a predetermined liquid level and for admitting air from the reservoir above the liquid level into the container to displace the dispensed liquid, the fluid passage being unobstructed by internally or externally disposed valving to permit the free flow of liquid and air therethrough, the tip end of the feed tube having a reduced cross sectional diameter for insertion into the internal recess and the tip end having complementary external gripping means for cooperating with internal gripping means in the plug portion to secure the plug portion on the tip end when the feed tube is inserted into the internal recess.

15. A system as claimed in claim 14, wherein the mounting means is removable from the cabinet.

16. A system as claimed in claim 14, wherein the container is unpressurized.

17. A system as claimed in claim 14, in which the sealing means comprises a substantially annular diaphragm element coupled to the entry portion of the mounting means.

18. A system as claimed in claim 17, wherein the diaphragm element carries a flexible peripheral member for sealingly engaging and closing the upper end of the reservoir.

19. A system as claimed in claim 18, wherein the sealing means is detachably connected to the lower end of the entry portion to permit ready removal therefrom.

20. A system as claimed in claim 17 or 18, wherein the

1338210

diaphragm element is formed with quick-disconnect means for coupling it to the lower end of the entry portion.

21. A system according to claim 14, wherein the mounting means is provided with an aperture outboard of the lower end of the entry portion for admitting air into the reservoir as liquid is discharged therefrom.

22. A system as claimed in claim 21, further comprising air filter means connected to the aperture for filtering the air admitted into the reservoir.

23. A system as claimed in claim 22, wherein the mounting means includes a portion adapted to be raised above the cabinet, and in which the filter means is disposed under the raised portion.

24. A system as claimed in claim 14 wherein the mounting means includes downwardly extending side walls, and internal ribs interconnecting the side walls and the tapered entry portion.

25. A system as claimed in claim 14 wherein the sleeve portion and the plug portion of the cap are integrally formed with a frangible connection therebetween including an area of reduced wall thickness, the frangible connection being adapted to be ruptured and the plug portion axially separated from the sleeve portion upon forcible insertion of the feed tube into the recess in order to permit the discharge of the liquid from the container.

26. A system as claimed in claim 14, wherein the internal gripping means includes a radially inwardly projecting annular lip formed on the plug and recess sealing portion, and the complementary external gripping means includes an annular groove formed in the tip end of the feed tube.

1338210

27. A system as claimed in claim 26, wherein the tip end of the feed tube has a tapered annular ramp portion adjacent the groove for guiding the inwardly projecting lip into the groove.

28. A system as claimed in claim 14, wherein the plug and recess sealing portion is dimensioned to fit sealingly within the sleeve portion when the inverted container is lifted off the mounting means and the feed tube is withdrawn from the recess.



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ABSTRACT OF THE DISCLOSURE

A hygienic liquid dispensing system having a cap to close the opening of an inverted liquid container is disclosed. The cap has a lid portion to overlie and sealingly close the opening and an annular skirt portion extending axially away from the lid to surround a portion of the container neck. The lid portion is provided with an axially inwardly extending recess including an outer sleeve and an inner plug portion integrally formed with a frangible connection therebetween. A feed tube is dimensioned for forcible insertion into the recess for breaking the frangible connection and separating the plug portion from the sleeve to permit the discharge of liquid from the container. A mounting apparatus is also provided to fit on the upper portion of a cabinet and defines an annular ring for supporting the inverted container thereon which also defines a tapered entry portion extending downwardly and inwardly from the annular ring for receiving the inverted container therein.

1338210

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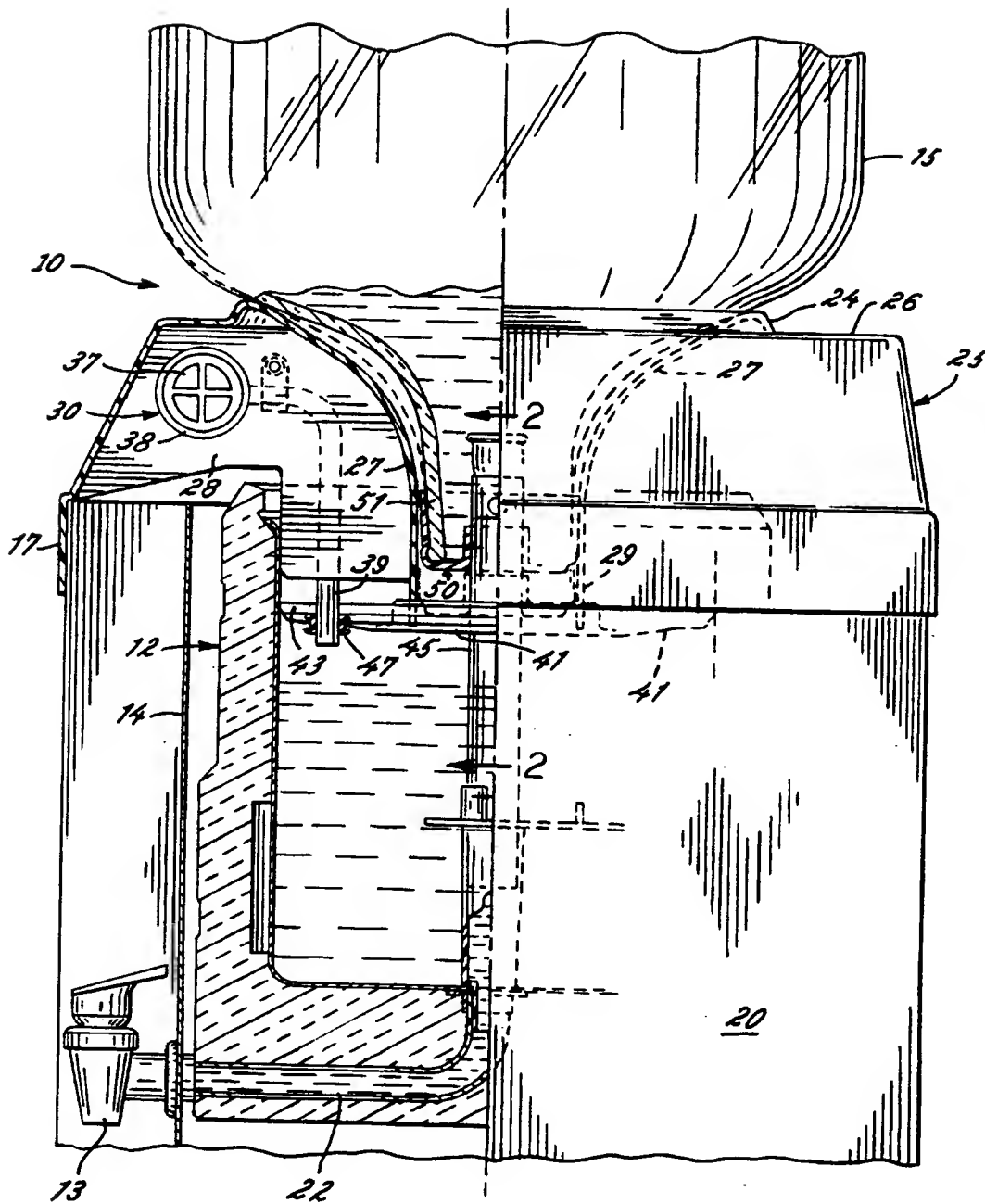


FIG. 1

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2/4

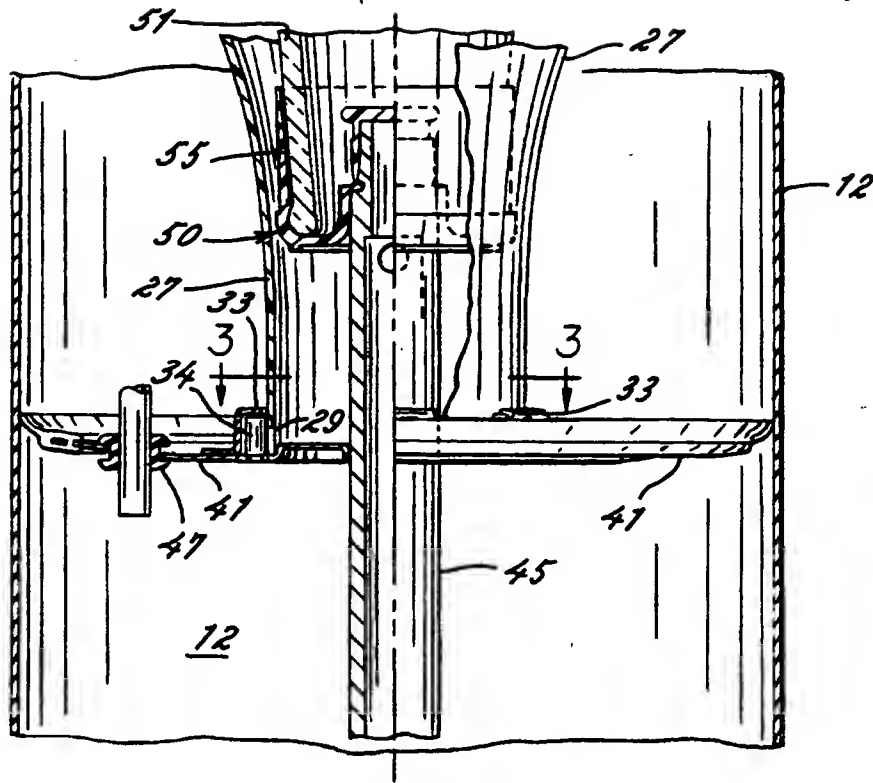


FIG. 2

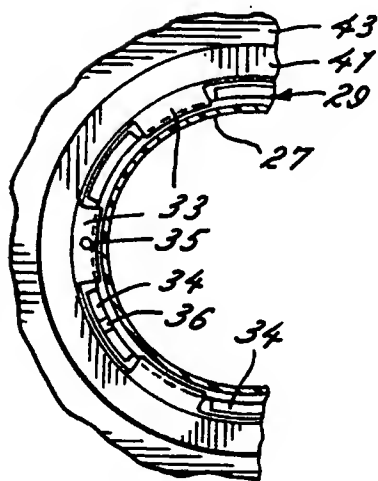


FIG. 3a

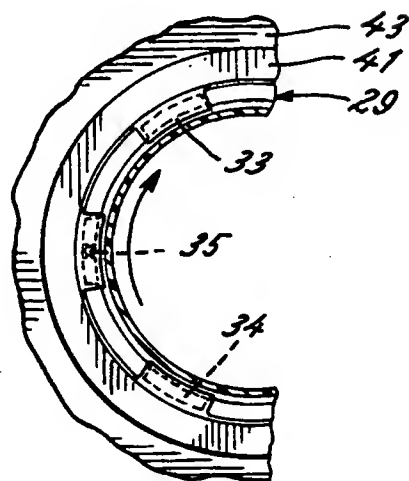


FIG. 3b

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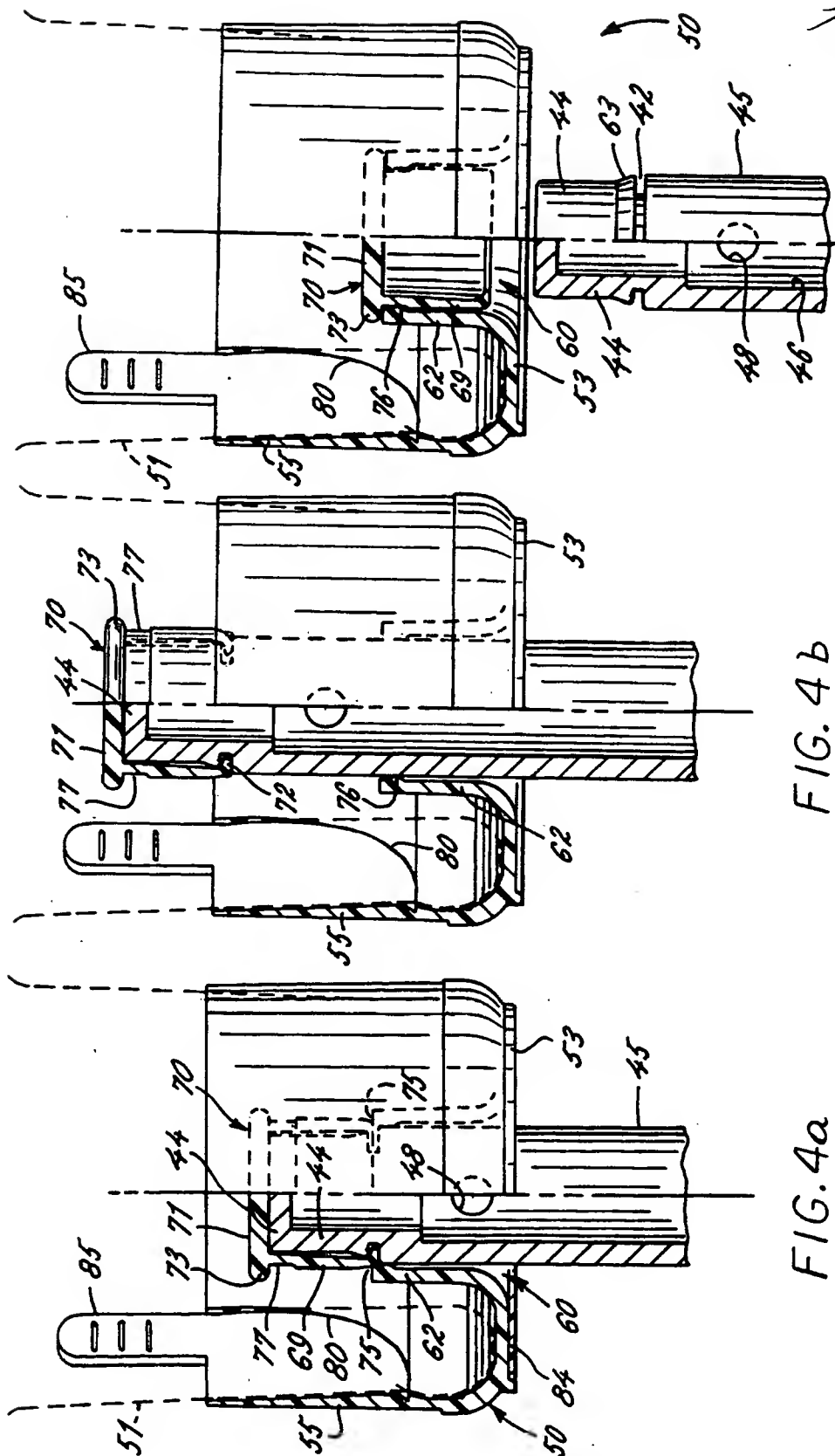


FIG. 4c

FIG. 4b

FIG. 4a

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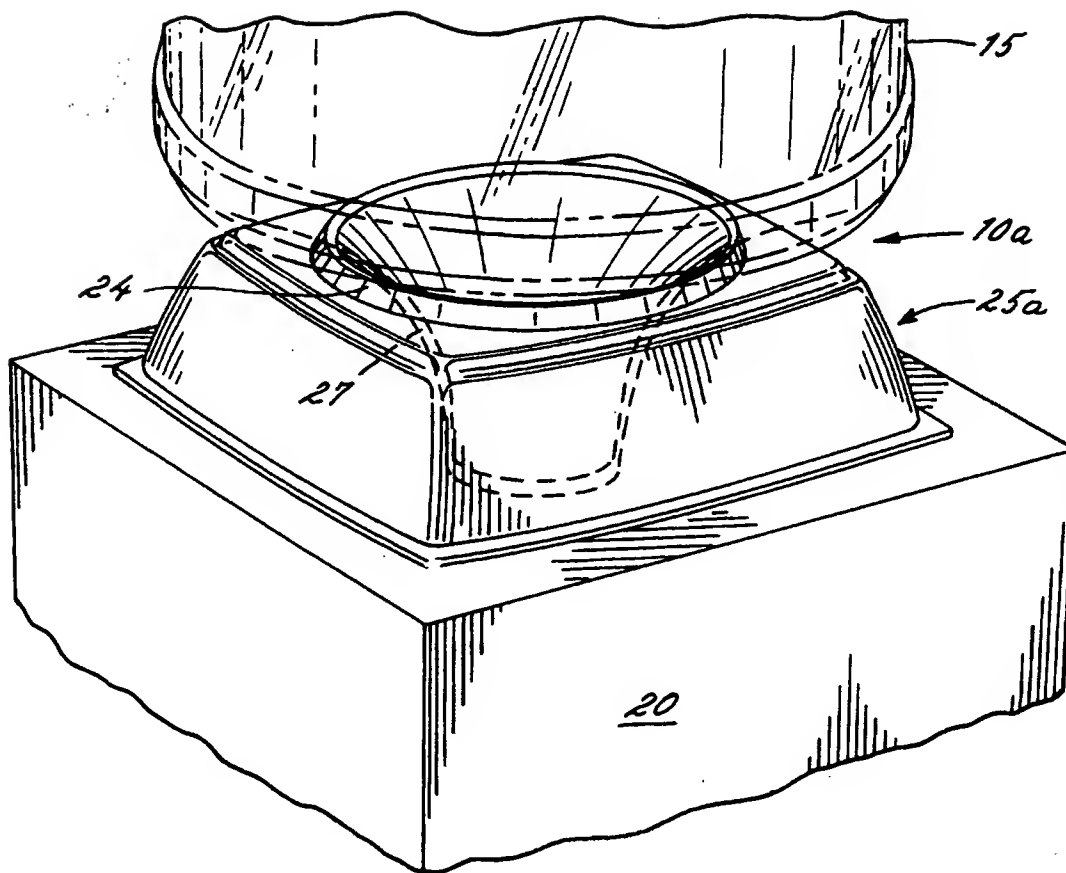


FIG. 5

